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<NOTE>

Update on the Assirik Chimpanzee (*Pan troglodytes verus*) Population in Niokolo Koba National Park, Senegal

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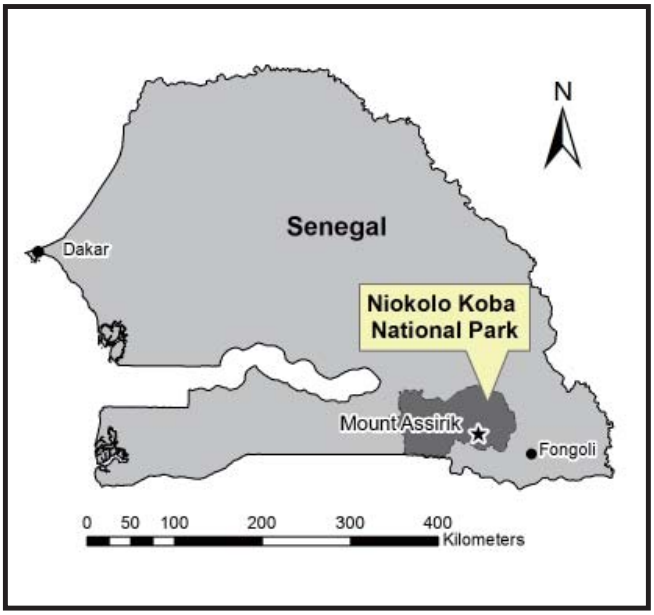

Figure 1. Location of Niokolo-Koba National Park in Senegal.

INTRODUCTION

The Assirik, Senegal chimpanzee population was studied extensively by McGrew and colleagues in the Stirling African Primate Project (SAPP) in the late 1970s[1] and surveyed by the Miami Assirik Pan Project (MAPP) in 2000[2]. These chimpanzees (thought to represent a single community[3]), within the Niokolo Koba National Park (or Parc National du Niokolo Koba, PNNK), remain the only protected population in the country, with most of Senegal's chimpanzees living in unprotected areas[4]. In 2012, the Iowa State Assirik Primate Project (ISAPP) surveyed Assirik and outlying areas in the PNNK to assess chimpanzee density and to explore the possibility of establishing a research program there in collaboration with the National Parks Department of Senegal and University of Cheikh Anta Diop in Dakar. One objective in this study was to re-survey the Assirik area in order to compare our results to data collected in 2000.

METHODS

Niokolo Koba National Park is in southeastern Senegal (12º53' N, 12º44' W) (Figure 1). The habitat is Sudano-Guinean mixed woodland and savanna, characterized by an extensive 7-month dry season and less than 1,000 mm of rainfall per year. The park has four diurnal non-human primate species (see Table 2) and two nocturnal species (*Galago senegalensis*, *Potto perodicticus*). Several potential mammalian predators on chimpanzees exist in the PNNK, including lion (*Panthera leo*), leopard (*Panthera pardus*), spotted hyena (*Crocuta crocuta*) and wild dog (*Lycaon pictus*)[5].

We combined systematic line transect and reconnaissance sampling of chimpanzee nests in an effort to replicate methods from the MAPP study[2]. However, with less than half of the time available to conduct the survey, we did only two rather than four 2-km transects that radiated from the summit of Assirik and did not repeatedly sample areas. On 12 different days, from January 26–February 2, 2012, we surveyed 115.7 km (78.7 km on foot, 37 km by vehicle) during daylight hours for chimpanzee nests. We sampled the Mt. Assirik area as well as areas to the south and north of this summit (Table 1, Figure 2). This included two 2-km transects at the Assirik summit and 6.7 km in two forested valleys (Stella's and Lion Valleys), in addition to searching wooded areas. In order to provide a measure of potential chimpanzee predators, prey and competitors, we calculated encounter rates (number of sightings or individuals per km) with mammals (excluding rodents and bats), on foot (102.4 km) and from the vehicle (448.6 km) between the Ranger Post to the southeastern section of PNNK. Vehicle surveys could cover the same area more than once and included encounters with animals seen on the Tambacounda-Kedougou highway running through the PNNK.

We made several assumptions in our analyses of nest densities. We assumed all nests were less than 120 days old and that each weaned chimpanzee built a new nest each night. We used a formula revised from Marchesi and co-workers[6]: Density = (# nests/area surveyed) (1/mean nest duration [120 days]) to calculate the density of nest-building chimpanzees. We weighted our values according to habitat type since the Assirik summit transects bisected only woodland and grassland habitats, and most nests were found in gallery forests. Therefore, we calculated nest density in woodland (including bamboo woodland = 42% of area) and gallery forest (3% of area) separately in order to produce a more accurate measure of chimpanzee density in this savanna mosaic. Percentage habitat values are from Baldwin and co-workers[7]. No nests were found in grassland habitats during the transect surveys, which accounts for 55% of the area used by Assirik chimpanzees[7]. We used data from the 2.77 km transect through Lion Valley to represent chimpanzee nest density in gallery forests and used the two 2-km transects from the summit of Assirik to represent woodland habitats, multiplying these values by 3% and 42%, respectively. This procedure replicates MAPP methods[2].

RESULTS

We recorded 840 nests built by chimpanzees in the PNNK (Table 1, Figure 2). Additionally, we heard at least one chimpanzee pant-hooting during a transect survey on the eastern slope of Assirik. Chimpanzee nest density in the PNNK was estimated at 1.28 individuals per km^2.

We recorded 16 mammal species during 106 sightings (0.19 per km) with 476 individuals (0.86 per km) (Table 2). We also found recent traces of poachers (e.g. shotgun shells, footprints, sounds of gunfire). During one foot survey, we encountered a group of poachers and then immediately left the area for safety reasons.

DISCUSSION

Although our results from this brief survey indicate that the chimpanzee population in the PNNK increased since the MAPP survey, from 0.13 nest-building chimpanzees per km^2 calculated in 2000[2] to 1.28 in this study, such an interpretation should be made with caution. The results reported here accounted for less than 7 km of line transects, compared to the 13.7 km surveyed in the 2000 study[2]. Plumptre[8] recommend surveying at least 200 km for forest-dwelling primates. However, effective sampling distances in a savanna environment are likely to be shorter because detection distances (i.e. strip width) are larger. In the MAPP survey[2], a detection distance of 36 m was calculated based on nest sighting distances, suggesting a strip width of

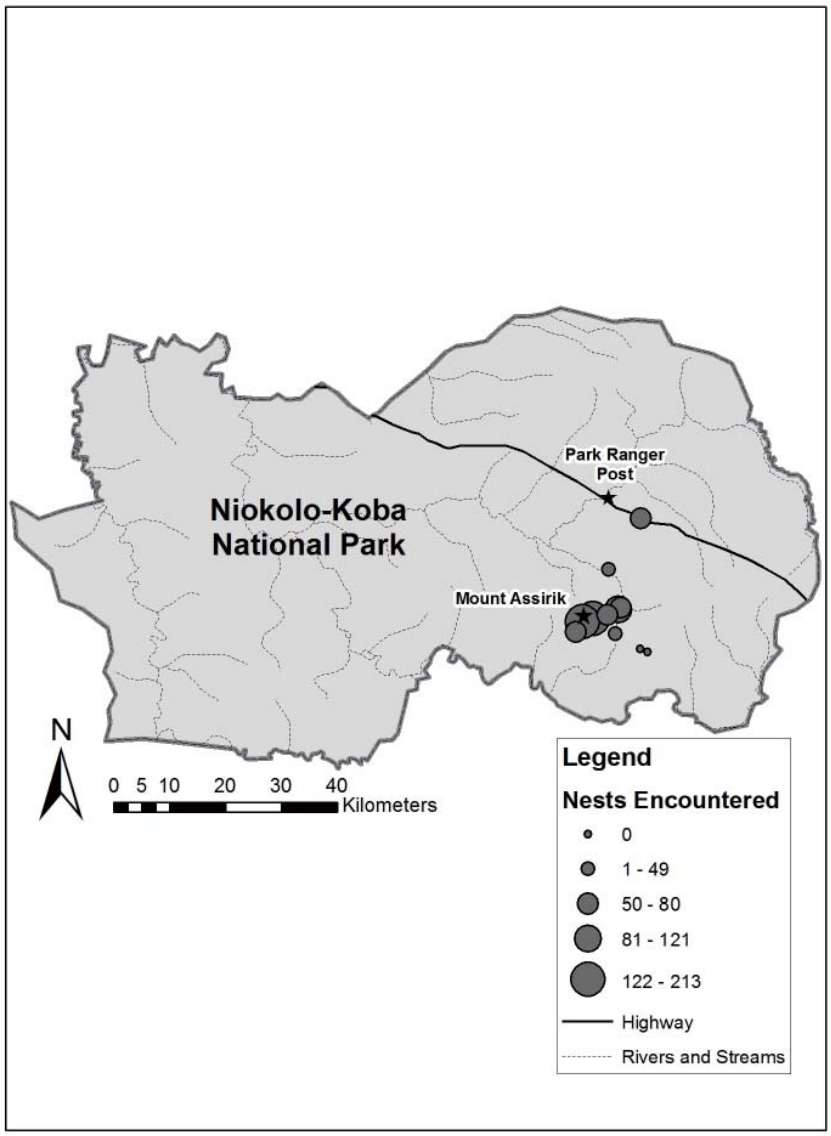

Figure 2. Locations of nest survey areas and number of nests encountered within Niokolo-Koba National Park.

Table 1. Surveys of chimpanzee nests and mammals in Niokolo Koba National Park. Nest survey distances are in parentheses.

Date	Km surveyed by vehicle	Km surveyed on foot	Nest count	Area surveyed	GPS point
16 Jan	79(26)	4(4)	0	Southeast of Assirik	12°49.373 N, 12°39.782 W
17 Jan	0(0)	23(23)	49	Southeast of Assirik	12°51.171 N, 12°42.945 W
18 Jan	35(0)	10(5.3)	0	Southeast of Assirik	12°49.400 N, 12°39.818 W
19 Jan	44(0)	0(0)	0	Highway	13°04.511 N, 12°43.384 W
23 Jan	69(5)	3.8(3.8)	78	Assirik woodlands	12°53.738 N, 12°42.360 W
24 Jan	0(0)	9.5(9.5)	75	Assirik area, Stella's Valley	12°53.012 N, 12°43.670 W
25 Jan	0(0)	11.4(11.4)	213	Mount Assirik area	12°52.682 N, 12°45.130 W
26 Jan	69(0)	1.7(1.7)	121	Assirik gallery forest and woodland	12°53.532 N, 12°42.589 W
30 Jan	69(0)	8.3(4.2)	30	Assirik gallery forest and woodland	12°57.469 N, 12°43.562 W
31 Jan	6(6)	12.4(7.6)	126	Mount Assirik area	12°52.401 N, 12°46.156 W
1 Feb	8.6(0)	14(5.7)	68	Assirik area, Lion Valley	12°51.395 N, 12°46.864 W
2 Feb	69(0)	4.3(2.5)	80	Tower highway gallery forest and woodland	13°02.407 N, 12°40.278 W
Total	**448.6(37)**	**102.4(78.7)**	**840**		

72 m provided a reliable estimate of chimpanzee nest density in this environment. Nonetheless, given the brief nature of our study, our comparative analysis should be used primarily as a relative measure of the presence and location of chimpanzees in the PNNK over the years. However, we found a large number of chimpanzee nests during a relatively brief survey, which is encouraging.

We recorded more nests in 2012 relative to the 2000 survey, although nest encounter rates (nests per km) were higher in 2000. A total of 29 km (on foot) and 54 km (via vehicle) were surveyed during the MAPP study[2] compared to the current effort of 78.7 km and 37 km surveyed by foot and vehicle, respectively. We recorded 840 nests along 115.7 km (7.3 nests per km surveyed), while MAPP recorded 736 nests along 83 total km (8.9 nests per km surveyed). We attribute the lower encounter rate in 2012 to reconnaissance sampling more than 10 km southeast of the Assirik summit, where no nests were observed (Figure 2).

Table 2. Mammal species recorded in Niokolo Koba National Park*.

Species	# times encountered	# individuals encountered
Baboon (*Papio hamadryas papio*)	27	248
Vervet monkey (*Chlorocebus aethiops*)	26	108
Patas monkey (*Erythrocebus patas*)	7	26
Warthog (*Phacochoerus africanus*)	7	26
Oribi (*Oribi oribi*)	16	23
Derby Eland (*Taurotragus derbianus*)	2	17
Duiker species (*Cephalophus* spp.)	9	12
Banded mongoose (*Mungos mungo*)	1	4
Bushbuck (*Tragelaphus scriptus*)	3	3
Hartebeest (*Alcelaphus buselaphus*)	1	2
Grimm's duiker (*Sylvicapra grimmia*)	1	1
Roan antelope (*Hippotragus equinus*)	1	1
Slender mongoose (*Galerella sanguinea*)	1	1
Egyptian mongoose (*Herpestes ichneumon*)	1	1
Mongoose (sp. indet.)	1	1
Civet? (*Viverra civetta*?)	1	1
Golden cat? (*Caracal aurata*?)	1	1
Totals	**106**	**476**

*Species heard but not seen were leopard (*Panthera pardus*), spotted hyena (*Crocuta crocuta*) and chimpanzee (*Pan troglodytes verus*)

Based on our 2012 records of nests in new areas surveyed relative to the 2000 study, we suggest that at least two chimpanzee communities use the PNNK, in contrast to the findings of Tutin and co-workers[3]. We recorded nests more than 20 km north of Mount Assirik (Figure 2). At the Fongoli site, less than 60 km from Assirik (Figure 1), the chimpanzees' home range is over 86km^2, and the furthest distance between points used by this community is around 10 km (Pruetz & Wessling, in prep.). We hypothesize that PNNK chimpanzees exhibit similar ranging patterns, and may in fact have smaller home ranges than chimpanzees outside of the PNNK since they do not experience anthropogenic disturbance, which accounts for 5% of the Fongoli range[9]. Although both the 2000 and the 2012 surveys occurred during the dry season (February–March and January, respectively), data on Fongoli chimpanzees indicate that savanna chimpanzees in Senegal use their home ranges seasonally and cyclically. Fongoli chimpanzees range most widely during the early dry season, when baobab is fruiting. It is possible that Assirik chimpanzees do so as well, ranging more widely from the summit during the early dry season (November–January) compared to the late dry season (February–April) due to the widespread dispersion of baobab trees, a key food source for Fongoli chimpanzees[10]. In any case, the harsh savanna environment coupled with confirmed poaching activity within the park's borders underscores the need for increasing conservation and management efforts for Assirik chimpanzees. Given the increasing human population in Senegal, it is possible that the human community surrounding PNNK will exert increasing competitive and predation pressures on chimpanzees in the years to come.

The increasing human population of Senegal is attributed to rising birth rates and immigration from surrounding countries. Large-scale mining is increasing here, and smaller-scale artisanal mining attracts people from other countries who may not have the same cultural values that have resulted in the protection of Senegal's chimpanzees via taboos against eating them[4]. The large mammal population in the PNNK is thought to be under increased pressure from poachers, and their presence could also affect the behavior of chimpanzees in this area, although they are not yet thought to be the target. We found more evidence of poachers in our 12 days in the PNNK than JDP observed in over 2 months during the 2000 study. As mining continues to develop in Senegal, the market for bushmeat is likely to increase even more, indicating the need to better protect this important area of wildlife diversity.

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<NEWS>
Dr. Julius Keyyu Visits WRC

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Dr. Julius Keyyu, Director of Research at the Tanzania Wildlife Research Institute (TAWIRI), visited Japan in May 2012. He was invited by the Wildlife Research Center (WRC), Kyoto University to attend an international symposium "Wildlife Studies in Tanzania" and a workshop "Prospect and Cooperation for Wildlife Research in Tanzania".

The study of great apes by Japanese researchers in Tanzania was pioneered by the late Dr. Kinji Imanishi and the late Dr. Junichiro Itani in 1961. In 1965, the late Dr. Toshisada Nishida was successful in provisioning wild chimpanzees in the Mahale area, and Mahale Mountains National Park was established in 1985 as the 11th National Park in Tanzania.

Research in Mahale Mountains N. P. under the leadership of Dr. Nishida produced a lot of important results. Key findings included the existence of the unit group (community), exchange of females among unit groups and the patrilineal structure of chimpanzee society, fission and fusion of individuals within a unit group, male alliances and dominant-subordinate relations, conflict between unit groups, various sexual behaviors, infanticide and cannibalism, sharing behavior, cultural behaviors, including tool-using behaviors. It can safely be said that these findings played an important role in developing our scientific understanding of a few differences between chimpanzees and human beings.

At the same time as work was beginning at Mahale, field research of wild chimpanzees was also carried out in the Ugalla area, which is located 100 km north-east of Mahale. Dr. Takayoshi Kano (now an honorary professor of Kyoto University) stayed alone in Ugalla during 1965-1967 and conducted a distribution survey of chimpanzees in Western Tanzania. In this survey, he established that the eastern limit for the distribution of chimpanzees in Tanzania was at long. 31°1' E on the left bank of the Ugalla River, and the southern limit was at lat. 6°38' S of the Wansisi Hill. The left bank of the Ugalla River is also the eastern limit of the distribution of the chimpanzee in Africa. Unfortunately, research in Ugalla was not continued after that because efforts were concentrated on work at Mahale.

In 1994, however, Dr. Hideshi Ogawa (Chukyo University) and I resumed the survey in Ugalla and studies there continue to the present day. Dr. Ogawa revised the southern limit of the distribution of chimpanzees in Tanzania to lat. 8°12' S. We have also revealed unique ecological characteristics of the miombo arid woodland of Ugalla, and interesting studies of various mammals and raptors have been initiated there.

The program of the symposium held on 16th May, 2012 is shown below. It began with a keynote presentation by Dr. Keyyu, who introduced activities and research in TAWIRI, and then the latest studies were described in three presentations for each of Mahale and Ugalla. These presentations dealt not only with chimpanzees, but also referred to various other fauna, including raptors, and to the vegetation and climate. The symposium stimulated active discussion among many researchers and students. We would like to express our sincere thanks to all of the participants in this symposium.

On the following day (the 17th May), a closed workshop was held among Dr. Keyyu and researchers of Mahale and Ugalla. We discussed future collaboration between TAWIRI and WRC in scientific research, conservation and education. Studies in most of the 16 national parks and 10 reserves for wild animals in Tanzania have been carried out by European and American researchers. Japanese researchers have mainly promoted studies in Mahale and Ugalla in western Tanzania. Although there is the Katavi National Park in the south of Mahale, foreign researchers seldom work there. So we also discussed a plan for Japanese researchers to develop studies in the whole of western Tanzania, from Katavi N.P. to Mahale and Ugalla. This workshop was a valuable event. One excellent outcome was an agreement to form a MOU between TAWIRI and WRC in the near future.

Dr. Keyyu had friendly discussions with researchers and students at WRC, and he also visited Kyoto City Zoo and Kyoto Aquarium. He was deeply touched to see a